May 21, 2019

Source Water Protection Strategy Update

Data Gathering and Analysis Workgroup Meeting #3 - Summary

1pm-3pm

The meeting began with a discussion of the strategic plan process and purpose of the meeting, which is to solicit feedback and endorsement of the Priority Matrix that was distributed to the group.

Prioritizing Technical Assistance and Training to PWSs Experiencing Blooms in Source Water

Tyler mentioned the "back of the envelope" vulnerability analysis done to prioritize program activities: this involved identifying those PWSs using surface sources that have had historic blooms, but did not monitor for cyanobacteria or supporting conditions, and have no watershed management plans. Feedback on the analysis was to add in whether or not microcystin was found in PWS or partner samples. An additional question was brought up related to the vulnerability analysis regarding whether there is a way to prioritize based on potential for a public health issue?

When a genus of cyanobacteria known to produce the toxin microcystin is found in a waterbody, the recommendation from the Jody Connor Limnology Center (JCLC) at DES and Nancy Leland is to sample every two weeks. It was noted that we should take a citizen science approach based on the resources NHDES could provide in terms of time, training and sampling. For training and technical assistance, NHDES should prioritize *Microcystis* dominated systems and extend the sampling season to October.

Understanding the cyanobacterial population within a specific waterbody through periodic cyanobacteria genus ID is important to understand the potential for rapid growth and toxicity (Leland and Haney 2018). These are important in terms of priorities for what PWSs' sources to prioritize and to work with toward preparing for and responding to a potential bloom event.

Technical Document on How to Classify Cyanobacteria Findings (SAMPLE)

Toxin	Analytical Method	Detection Limit	Description
Microcystin	HPLC-PDA	0.5	Detection of microcystins by HPLC/PDA provides a spectrum of a separated analyte and attains a detection limit of considerably less than 1 µg/L for individual microcystins with appropriate concentration and cleanup procedures.
	LC-MS	<1.0 for individual microcystins	LC-MS is the method of choice, if available, for the measurement of toxins in drinking water
	PPIA	0.1	Useful as a screening tool, relatively simple to use, highly sensitive, with low detection limits relative to guideline values.
	ELISA	0.05	Detection of microcystins by ELISA provides semi-quantitative results
	Mouse Bioassay	N/A	Qualitative, screening assay

According to the US EPA, microcystin is believed to be the most widespread of algal toxins, and is a potential liver toxin and possible human carcinogen. The parameters influencing the growth of cyanobacteria are as follows; temperature, phosphorus, secchi depth, pH and dissolved oxygen, and turbidity. The Global Water Research Coalition with Water Quality Research Australia has created an International Guidance Manual for the Management of Toxic Cyanobacteria; this manual provides information pertaining to the tasks associated with the need to;

- Understand the importance of cyanobacteria and the toxins they produce
- Assess the risks associated with a particular water source
- Develop a monitoring program and incident management strategies consistent with the WHO Water Safety Planning process

For long-term reduction in the potential for cyanobacteria blooms to have negative impacts, the approach is to investigate management procedures in the source water to reduce favorable

conditions for cyanobacteria blooms and adjust treatment and bloom PWS response procedures to mitigate the risks posed by the presence of toxic compounds in drinking water.

Increasing the Number and Quality of Cyanobacteria Monitoring Programs at Surface Sources of Drinking Water

It was noted by Nancy to de-emphasize the term "bloom-event" in the strategy update process, because toxin concentrations tend to peak prior to a visual bloom.

The long-term goal is to have all public water systems using surface sources with a history of cyanobacteria blooms monitoring their surface source(s) for cyanobacteria on a regular basis. The discussion focused on what to sample for, the interval for sampling, how the sampling is completed on source water, and who will do it. It was noted that continuous monitoring is not always necessary. Should we use fluorometry as a flag for "real time" monitoring?
It was noted that EPA is looking at new way to organize cyanobacteria data collected under the EPA CMC program. It was noted that bloom location is important to know. Where are the blooms going after they dissipate? Is this something we would be able to visually represent using ArcMap? (i.e., a heat map). It was noted that regular monthly sampling with no significant results may dissuade PWSs from regular monitoring. Under what conditions should recommendations be NOT to do regular sampling? Regular sampling should be near any known bloom activity.

Discussion took place regarding a public facing summary report for cyanobacteria monitoring with sample data entered directly into a spreadsheet or MS Access report to include Latitude/Longitude of sample sites, flurometric readings, etc. and having linked sheets to instantly update charts and graphs with thresholds and "normal" zones for key parameters. It was noted by Amanda that the handheld fluorometer is sometimes not sensitive enough at low levels of cyanobacteria. (See discussion below under "Improving Access to Cyanobacteria Data")

The question was posed as to whether or not VLAP/Lay Lakes were taking on new projects? It was noted that they are not, but for existing local VLAP/Lay Lakes programs at surface sources of drinking water it may be possible to extend sampling to include sampling for cyanobacteria according to EPA CMC protocol, for those that are not already doing so.

IMPROVE TRAINING RELATED TO CYANOBACTERIA MONITORING AND MANAGEMENT

The consensus for this area of work is that NHDES/Source Protection should look into supporting a training certificate through University of New Hampshire Professional Development and Training that would be eligible for technical contact hours for NH Water Works Certified Operators. It was discussed that there was a need to tailor the training to the water supply operator needs.

IMPROVE ACCESS TO CYANOBACTERIA DATA

The question was posed 'What is the value of the data and how do we make the data accessible to PWSs?" and it was agreed upon that there is a need to create an accessible product. It was determined that trend analyses be drinking water source specific. There needs to be a continuing discussion regarding the EPA Cyanobacteria Monitoring Collaborative (CMC) data (i.e., where is it located? How is it shared?).

The idea was brought up to develop a brief cyanobacteria report similar to a trophic report and include the activities "driving" the bloom and ID benchmarks. It was noted that we should create a template to serve as a management tool and categorize what reasonable data we are able to collect (this can be site specific). It was noted that we should develop relationships with stakeholders, to make sure that the data is useful. There was discussion that there is a need to address the issue of advisories vs. alerts, is there a way to make the information behind these notices available to the public in a more efficient way? The consensus of all is to engage in continuous data driven decision making.

DEVELOP WATERSHED PLANS TO MITIGATE WATER QUALITY CONDITIONS THAT ARE FAVORABLE TO CYANOBACTERIA

The discussion of this area of work was questioned as to whether the time spent working on watershed plans vs. future outcomes was more important? It was noted that we should partner with the Watershed Management Bureau to work to limit impaired source water bodies. It was noted that for drinking water specifically, a water body is only considered impaired once treatment does not result in water meeting the MCLs.

It was noted that sources often do not have watershed management plans. Reaching out to watershed protection groups (such as Canobie Lake or Lake Waukewan) was discussed, along

with the need to highlight which groups are the most active, and which plans require greater quantitative data that follow NHDES/EPA guidance, and prioritize these two groups.

The consensus of the group was to focus efforts to create/implement watershed-based plans in the southeastern portion of the state. Monitoring for certain parameters (those monitored for within NYC's watershed were noted) and better quantification of internal and external loading were discussed. Discussion of what parameters should be monitored and for what reasons, (ex: phycocyanin/chlorophyll-a to forecast potential blooms) and to identify solutions for external/internal nutrient loading (ex: monitoring, nutrient reduction, local regulatory controls, dredging).

PRIORITIZE WATER TREATMENT OPTIMIZATION AT PWS BASED ON THE RISK OF EXPOSURE TO CYANOBACTERIATOXINS

It was noted that the EPA defines optimized treatment and that an asset management plan could be critical to future investments for PWS. Is there a "fail-safe" treatment option? Is chemical filtering necessary if the source is only susceptible to cyanotoxins? Should we prioritize systems that provide to a larger population?

IMPROVING PWS RESPONSE TO A CYANOBACTERIA BLOOM

The procedure behind preparedness prior to sampling was discussed. Externally and internally (DES, DHHS) are they supplied? (bottles @ ready etc.) Incentivizing training opportunities (even for just the primary operator) could be beneficial, especially if included in the emergency response planning.

Emergency response planning should vary dependent upon the type of toxin identified (e.g., microcystin, anabaena, etc.). The question was posed how is Manchester Water Works responding in different types of situations and would we be able to use their plan as a model. Amanda and Nancy voiced the need for toxin testing, even if anabaena and the concern of the limnologic end of season shift and lack of end-of-season monitoring. The need for high-density polyethylene (HDPE) bottles on-hand to sample a potential cyanobacteria bloom was addressed. It was noted that the current analysis only requires the need to look at presence or absence of the cyanobacteria sample, but that DHHS does have the ability to test for Anatoxin-a via EPA Method 545.